UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/531,417	06/02/2005	Toshiyuki Morii	P27750	7983

52123 7590 12/15/2008
GREENBLUM & BERNSTEIN, P.L.C.
1950 ROLAND CLARKE PLACE
RESTON, VA 20191

EXAMINER	
LERNER, MARTIN	

ART UNIT	PAPER NUMBER
2626	

NOTIFICATION DATE	DELIVERY MODE
12/15/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gbpatent@gbpatent.com
pto@gbpatent.com

Office Action Summary	Application No.	Applicant(s)
	10/531,417	MORII, TOSHIYUKI
	Examiner	Art Unit
	MARTIN LERNER	2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 26 November 2008.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1 to 4 and 6 to 10 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1 to 4 and 6 to 10 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 22 January 2008 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 1 to 4 and 6 to 10 are objected to because of the following informalities:

Independent claim 1 sets forth the limitation of “the waveform number”, but clear antecedent basis is not given for the limitation. The claim says that “a number representing an excitation vector waveform candidate" results from a remainder operation, but there is no express antecedent basis for "the waveform number". Antecedent basis could be provided by changing "the waveform number" to “the number of the waveform candidate” or "the waveform candidate number".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 9 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by *Yasunaga et al*.

Claims 9 and 10 recite product-by-process claim limitations. Generally, product-by-process claims are not limited to the manipulations of the recited process steps, only

the structure implied by the steps. See MPEP §2113. Strictly speaking, then, product-by-process claims are only limited by the structure. Claims 9 and 10 set forth a speech coding apparatus and speech decoding apparatus that perform coding and decoding of an excitation vector of a codebook. It follows that the prior art need only disclose a speech coding apparatus and speech decoding apparatus that perform coding and decoding of an excitation vector of a codebook in order to anticipate claims 9 and 10. *Yasunaga et al*. discloses a speech coder and speech decoder that generates an excitation code vector from a codebook. (Title and Abstract: Figure 18) Thus, claims 9 and 10 are anticipated by *Yasunaga et al*.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 3 to 4, and 6 to 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Yasunaga et al*. in view of *Miseki et al*.

Concerning independent claim 1, *Yasunaga et al*. discloses a method of coding speech, comprising:

"associating an excitation waveform vector of a predetermined channel with [a remainder operation result of a number representing] an excitation vector waveform candidate of another channel [used to acquire the waveform number]" – an excitation

vector generator has a fixed waveform storage section 181 for storing three fixed waveforms v1, v2, and v3 of channels CH1, CH2, and CH3 ("an excitation vector waveform candidate of a predetermined channel"); fixed waveforms v1, v2, and v3 are stored in advance in the fixed waveform storage section 181, and fixed waveform arranging section 182 reads out fixed waveforms v1, v2, and v3 from fixed waveform storage section 181 (column 32, lines 5 to 26: Figure 18); fixed waveform v1 is arranged at start position P1 selected from start position candidates for CH1, fixed waveform v2 is arranged at start position P2 for CH2, and fixed waveform v3 is arranged at start position P3 for CH3, as shown in Table 8; code numbers correspond, one to one, to a combination of selectable start position candidates of the individual fixed waveforms (column 32, lines 17 to 48: Figure 18: Table 8); broadly, fixed waveform v1 ("an excitation waveform vector of a predetermined channel") "associates" with fixed waveform v2 and fixed waveform v3 at start positions P1, P2, and P3 by an ordered array ("an excitation waveform candidate of another channel"), in one to one correspondence, as shown by Table 8; that is, a first pulse position 0 of fixed waveform v1 is associated with a first pulse position 2 of waveform v2 and a first pulse position 4 of waveform v3, second pulse position 10 of waveform v1 is associated with second pulse position 12 of waveform v2 and second pulse position 14 of waveform v3, etc.;

"searching for an excitation vector waveform that minimizes coding distortion using the associated excitation vector waveform candidate of the predetermined channel and the excitation vector waveform candidate of another channel" – generally, a CELP type speech coder carries out an excitation vector search in an adaptive

codebook 14 and a random codebook 15 to minimize a coding distortion (column 1, lines 32 to 55: Figure 1); specifically, a fixed waveform v1 is read from a fixed waveform storage section 181A, at a position p1 selected from start position candidates for CH1, based on start position candidate information for fixed waveforms shown in Table 8, and likewise arranges the fixed waveforms v2 and v3 at respective positions P2 and P3 selected from start positions candidates CH2 and CH3; the arranged fixed waveforms are sent to the adding section 183A and added to become an excitation vector c; synthesis filter 194 synthesizes the excitation vector c, and sends it to distortion calculator 205; distortion calculator 205 computes a distortion of every combination of start position candidates from fixed waveform arranging section 182A, and finds the combination of start position candidates that minimizes the coding distortion; that combination of start position candidates is selected (column 34, lines 7 to 37: Figures 18 and 19A);

"determining a code of the excitation vector of the stochastic codebook using a code of the excitation vector waveform obtained by searching" – a combination of the start position candidates that minimizes the coding distortion is selected, and the code number which corresponds, one to one, to that combination of start position candidates is transmitted to the transmitter 196 (column 34, lines 32 to 37: Figures 18 and 19A); implicitly, the terms "fixed codebook", "random codebook", "noise codebook", and "stochastic codebook" are all synonymous in a CELP type speech coder.

Concerning independent claim 1, *Yasunaga et al*. omits a coding method involving "a remainder operation result of a number representing" an excitation vector

waveform candidate of another channel "used to acquire the waveform number". However, *Miseki et al*. teaches a CELP scheme for coding speech, where a pre-selecting section 212 for a noise codebook 100 uses a function L(p, n) = n mod p, which involves a remainder obtained by dividing n by p. That is, L(p, n) is a remainder obtained from a mod function. The remainder function L(p, n) is used to group elements having a same polarity, and partial inner products f_k are obtained by calculating inner products between only elements k which satisfy the remainder function, k = n mod p. (Column 17, Lines 25 to 67: Figure 7) Here, the index *k*, for partial inner products, f_k, tells partial inner product calculating section 301 to select only even elements of seed vector Vi, *i.e.*, v_0, v_2, v_4, and odd elements of seed vector Vi, *i.e.*, v_1, v_3, v_5. Thus, index *k*=0 represents "the waveform number" for waveform number 0 of even elements v_0, v_2, v_4, and index *k*=1 represents "the waveform number" for waveform number 1 of odd elements v_1, v_3, v_5. A grouping, or "association", of elements is in accordance with a remainder function, L(p, n), and indexes, *k*, of corresponding waveform candidates are numbers used to optimize selection of waveform candidates after summing a correlation with reference vector R. *Miseki et al*. suggests objectives of performing a high speed index search even if the number of bits is large to obtain excellent quantization performance. (Column 3, Lines 45 to 61) It would have been obvious to one having ordinary skill in the art to perform a remainder operation to select excitation vector waveform candidates as taught by *Miseki et al*. in a CELP type speech coder of *Yasunaga et al*. for a purpose of performing a high speed index search with excellent quantization performance.

Concerning claim 3, *Yasunaga et al*. discloses a CELP type speech coder (Abstract), where the excitation information is used as a random codebook in a speech coder/decoder (column 32, lines 57 to 59); a stochastic codebook is known to be an equivalent term to a random codebook for speech coding by CELP.

Concerning claim 4, *Yasunaga et al*. discloses a CELP type speech coder (Abstract), where the excitation vector is provided from an algebraic codebook (column 62, lines 51 to 52; column 63, lines 18 to 19; column 65, lines 15 to 17; column 65, lines 29 to 31; column 66, lines 9 to 10).

Concerning claims 6 and 7, *Yasunaga et al*. discloses that the random codebook produces an excitation vector that is coded with a pulse sequence (column 3, lines 52 to 56; column 3, line 65 to column 4, line 4; column 4, lines 46 to 61); *Miseki et al*. teaches a remainder operation result is associated with a pulse position or an index of a pulse position because index k=0 represents even pulse positions for elements v_0, v_2, v_4, and index k=1 represents odd pulse positions for elements v_1, v_3, v_5 (column 17, lines 25 to 67: Figure 7).

Concerning claim 8, *Miseki et al*. teaches that absolute value adder 302 calculates the sums of the partial inner products to select indexes of the codebook that maximize correlation sums cor(i) (column 17, lines 49 to 67: Figure 7: Equation (4)); thus, there is an addition of remainder operation results of partial inner products f_k.

Concerning claim 9 and 10, *Yasunaga et al*. discloses a random codebook for a CELP type speech coder/decoder (Abstract), and produces an excitation code vector (column 32, lines 5 to 14: Figure 18).

6. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Yasunaga et al*. in view of *Miseki et al*. as applied to claim 1 above, and further in view of *Mitsubishi (JP '097)*.

Yasunaga et al. searches for an excitation vector from random codebooks by a search algorithm, but does not expressly disclose a search algorithm of n-fold loops, where n is a number of channels, that changes an excitation vector waveform candidate within a loop in accordance with an excitation vector waveform candidate outside the loop. However, *Mitsubishi (JP '097)* teaches a method of voice encoding by CELP, where excitation vectors are selected by searching for vectors that have a minimum difference between an input voice signal and a synthesized voice signal. Specifically, a noise excitation vector is composed of four pulses, and a search is made sequentially by a quadruple loop of a 1st loop <LOOP1N> to a 4th loop <LOOP4N>. (Abstract) Thus, a 1st loop determines a first pulse, a 2nd loop determines a second pulse, a 3rd loop determines a third pulse, and a 4th loop determines a fourth pulse, where results of the inner loops are affected by the results of the outer loops. One skilled in the art would recognize that an algorithm executed as a series of nested loops would be an effective iterative process for synthesizing an excitation vector of a speech coder because an objective is to minimize a difference between an input voice signal and a

voice signal synthesized from the excitation vectors. It would have been obvious to one having ordinary skill in the art to produce the three fixed waveforms, corresponding to the three channels, of *Yasunaga et al*. by a search algorithm of nested loops as taught by *Mitsubishi (JP '097)* for a purpose of achieving an effective procedure for minimizing a difference between an input voice signal and a voice signal synthesized from excitation vectors.

Response to Arguments

7. Applicant's arguments filed 26 November 2008 have been fully considered but they are not persuasive.

Firstly, new grounds of rejection are set forth under 35 U.S.C. §102(b) for claims 9 and 10 as being anticipated by *Yasunaga et al*. Claims 9 and 10 recite product-by-process claim limitations. Generally, product-by-process claims are not limited to the manipulations of the recited process steps, only the structure implied by the steps. See MPEP §2113. Strictly speaking, then, product-by-process claims are only limited by the structure. *Yasunaga et al*. discloses the structure recited by claims 9 and 10, directed to a speech coding and decoding apparatus that codes and decodes an excitation vector of a codebook.

Secondly, Applicant submits that the amendment, specifying that the excitation vector candidate of a predetermined channel is associated with a remainder operation of a number representing an excitation vector waveform candidate of another channel used to acquire the waveform number, should render allowable independent claim 1.

Applicant states that it appeared from the interview that the prior art of record did not disclose that feature.

In fact, however, no representation was made during the telephone interview that the proposed amendments would render the claims allowable. Indeed, the Interview Summary clearly states that the amendment would still leave the independent claim obvious over *Yasunaga et al*. in view of *Miseki et al*., although it was noted that the amendment would eliminate the anticipation rejection of independent claim 1 by *Yasunaga et al*.

Basically, *Yasunaga et al*. discloses all of the limitations for association of waveform candidates from a plurality of channels, and determining an optimum excitation code vector by searching for one that minimizes distortion, as is well known in the art of excitation pulse coding of speech signals for cellular telephones, but omits only a remainder operation to associate waveform candidates. Still, *Miseki et al*. teaches employing a remainder operation to associate odd and even pulse positions of a seed vector Vi to obtain optimum correlations with a reference vector R. Optimizing a correlation of a seed vector Vi with a reference vector R ensures that the speech codes produce speech waveforms that are optimized to be close to the input speech. Broadly, *Miseki et al*. uses a remainder operation to select pulse positions of the waveforms for correlation optimization, where the even and odd pulse positions correspond to decomposing the seed vector into channels.

Applicant is encouraged to look at Embodiment 1 and Embodiment 2 from the Specification, Pages 11 to 12 and Pages 15 to 16, respectively. Embodiment 1

discloses changing an index of a predetermined channel in accordance with another channel by grouping pairs of pulses in each channel as described by Equation (5). Embodiment 2 discloses changing pulse positions of a predetermined channel in accordance with pulse positions of another channel to obtain adjusted pulse positions as described by Equation (6). While no representation of the allowability of these limitations is made, Applicant can certainly narrow the independent claim to more precisely set forth the disclosed invention. Applicant's Specification, Page 3, Lines 4 to 22, states that the objective of the invention is to increase sound quality by enabling variations that use pulses at positions where previously there were no pulses.

Therefore, the rejections of claims 9 and 10 under 35 U.S.C. §102(b) as being anticipated by *Yasunaga et al*., of claims 1, 3 to 4, and 6 to 10 under 35 U.S.C. §103(a) as being unpatentable over *Yasunaga et al*. in view of *Miseki et al*., and of claim 2 under 35 U.S.C. §103(a) as being unpatentable over *Yasunaga et al*. in view of *Miseki et al*., and further in view of *Mitsubishi (JP '097)*, are proper.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Lerner whose telephone number is (571) 272-7608. The examiner can normally be reached on 8:30 AM to 6:00 PM Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Hudspeth can be reached on (571) 272-7843. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Martin Lerner/
Primary Examiner
Art Unit 2626
December 9, 2008